

# Price Deflators for Consumer Commodities and Capital Equipment, 1929-42

By Henry Shavell

AS indicated in previous articles, the Bureau of Foreign and Domestic Commerce has in progress a comprehensive study of national product. In its final form, this study will provide detailed estimates of the values of all final goods and services annually produced, in both current and constant dollars. Because of the usefulness of these data, segments of the study are being released as they become available. Preliminary estimates of the gross flow of finished commodities, new construction, and of consumer expenditures for most types of services have already been published.<sup>1</sup>

The completion of the detailed commodity flow estimates will make possible a more refined adjustment for price changes than has hitherto been the case. In the present article, there are made available for the first time a series of comprehensive price indexes designed for deflating consumer expenditures for new commodities and business expenditures for capital equipment. Similar price deflators for other segments of the national product (i. e., construction activity, services, etc.) are now in preparation and will be presented at a later date.

Heretofore it has been customary to convert the current dollar value of national income or national product to real terms by the use of existing price indexes. For example, the Bureau of Foreign and Domestic Commerce has previously employed combinations of the Bureau of Labor Statistics index of cost of living, the Bureau of Agricultural Economics index of prices paid by farmers for subsistence goods, and the National Bureau of Economic Research wholesale price index of capital equipment for national income and national product deflation. The various alternatives along these lines have been described by Prof. Simon Kuznets.<sup>2</sup>

The rationale for these crude methods of correction for price changes was essentially one of expediency, in that more suitable price deflators were not immediately available. It has long been recognized, of course, that existing price indexes (or their combinations) are not entirely appropriate for national income or national product deflation because of two fundamental reasons, both stemming from the fact that such indexes are specifically designed to represent particular segments or types of expenditure. First, the weights

assigned to the various commodities or services in the existing indexes do not correspond to their relative importance in the national expenditure. Second, many items in the national product are not covered, either directly or indirectly, by existing price indexes. It will be the aim of the deflation procedure finally adopted by this Bureau, as it is the aim of the indexes covering commodity flow presented here, to remedy these two principal defects.

It is often desirable, moreover, not only to measure changes in the real content of aggregate finished commodity flow but also to measure changes in the flow of the component groups. The broader budgetary classifications employed in the published indexes of the Bureau of Labor Statistics and Bureau of Agricultural Economics do not make possible such detailed measurements. The more complete detail afforded by the present price indexes will permit separate price correction for each of the minor commodity flow groups.

## Considerations in the Construction of Price Deflators.

If complete and accurate data were available, a measure of the real flow of commodities could be obtained either by counting up the actual quantities of the goods produced, weighted by various sets of prices, or by deflating the current money values of the same goods by appropriate price indexes.

Practical considerations, however, dictate the adoption of the deflation technique. Firstly, quantity data for the bulk of finished commodities are either not available or are too fragmentary to merit consideration. On the other hand, price quotations are available for the major portion of gross commodity flow. Secondly, it is more reasonable to assume that the average price changes of those commodities not directly covered by specific price quotations would be approximated by the average price movements of closely analogous commodities, than to make a similar assumption with regard to average quantity movements. Lastly, adjustments for price comparability—arising from new commodities, quality changes, etc.—are more easily handled than adjustments for quantity comparability.<sup>3</sup>

To obtain a strictly accurate measure of real commodity flow by means of deflation, the price deflators to be employed should be based upon (a) final prices paid—i. e., retail prices, inclusive of all taxes; (b)

<sup>1</sup> Cf. Shaw, William H., "The Gross Flow of Finished Commodities and New Construction, 1929-41," *Survey of Current Business*, April 1942, pp. 13-20, and Denison, Edward F., "Consumer Expenditures for Selected Groups of Services, 1929-41," *Survey of Current Business*, October 1942, pp. 23-30.

<sup>2</sup> Cf., for example, his "National Income and Its Composition, 1919-1938," National Bureau of Economic Research, 1941, vol. I, pp. 141-146.

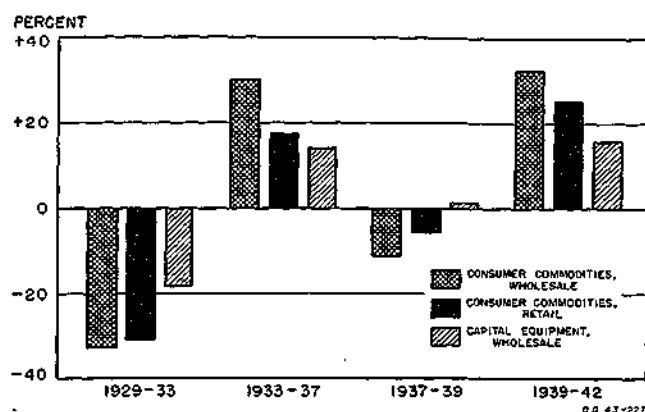
<sup>3</sup> For a few standardized commodities (coal, gasoline, etc.), the construction of physical quantity indexes may, in the future, prove more feasible than price deflation in measuring real changes. In such instances, this procedure will be employed in the final estimates.

prices that are comparable through time—i. e., not affected by quality changes;<sup>4</sup> and (c) prices that cover each item entering into the given current value composite.

As is well recognized, however, these ideal specifications cannot be filled precisely, because of the imperfections inherent in all price quotations. Strictly speaking, to the extent that a price index does not take full account of the collateral terms of sale—i. e., discounts, guarantees, free services, and other formal price modifiers—its validity as a deflator is accordingly lessened. The same is true in cases where the quality-change element has not been satisfactorily removed; the latter factor is especially significant in the case of durable goods, such as radios, automobiles, refrigerators, and capital equipment. Also, for certain commodities included in the current dollar commodity flow series retail price quotations are not available.

As outlined in the April 1942 *Survey of Current Business*, the method of estimating finished commodity

Chart 1.—Percentage Change in Prices of Consumer Commodities and Capital Equipment, Between Selected Years



Source: U. S. Department of Commerce.

expenditures involved securing commodity data at manufacturers' prices and tracing their flow through the entire distributive system. The consequent availability of estimates at both wholesale and retail levels makes deflation possible at either or both levels. If both sets of price quotations are equally representative, deflating consumer commodity expenditures at wholesale by appropriate wholesale price indexes and marking up the deflated figures by constant base year average retailers' mark-ups should result in the same final cost deflated series as that obtained by retail price deflation of consumer expenditures at final cost. However, by deflating the wholesale as well as the retail current value series, two important advantages are gained: (a) commodities for which retail prices are not available can often be priced at the wholesale level; (b) two independently derived deflated series are obtained,

<sup>4</sup> It is important that quality changes are not removed in the deflating process, since a change in quality represents a change in real content—i. e., quantity.

thereby yielding a more substantial basis for appraising the validity of the resulting real commodity flow series.

In combining the various prices, the chief alternatives are to employ weights corresponding to the quantities purchased either (a) in the base year or (b) in the given year. If the first alternative is chosen, the procedure corresponds to the fixed weighted or Laspeyres formula, given by  $\frac{\sum p_1 q_0}{\sum p_0 q_0}$ , where  $p_0$  and  $q_0$  represent, respectively, the prices and quantities purchased in the base year, and  $p_1$  and  $q_1$  the prices and quantities prevailing in any given year. If the given year weights are used, the procedure follows the variable weighted or Paasche formula, shown by  $\frac{\sum p_1 q_1}{\sum p_0 q_1}$ . It is well established that neither index would yield the "true" price change, but when used separately would provide upper and lower limits between which the "true" price change would lie.<sup>5</sup> Irving Fisher's "ideal" formula is an attempt to approximate the position of the "true" change by averaging the fixed and variable weighted indexes geometrically; it may be represented by

$$\sqrt{\frac{\sum p_1 q_0}{\sum p_0 q_0} \times \frac{\sum p_1 q_1}{\sum p_0 q_1}}$$

Although the "ideal" index is still essentially an expedient, it is useful as a "shorthand" approximation to the desired price change when the divergence between the fixed and variable weighted index numbers is small.

#### Price Deflators for Finished Commodities.

Price indexes for consumer commodities at retail, at wholesale, and for capital equipment at wholesale<sup>6</sup> are given in tables 1, 2, and 3, respectively. The classifications employed in the construction of the indexes were, naturally, conditioned by those used in the present study of national product. A brief description of these classifications was given in the April 1942 *Survey of Current Business*.

It should be emphasized that the indexes are not the product of independently collected price data but are constructed from existing price information in a manner appropriate for deflating specified segments of commodity flow. Most of the retail price indexes are recombinations of the relevant components of the Bureau of Labor Statistics index of cost of living and of the Bureau of Agricultural Economics index of prices paid by farmers, utilizing the detailed weighting factors developed in the national product study.

<sup>5</sup> Cf. especially Hicks, J. R., "The Valuation of the Social Income," *Economica*, May 1940, pp. 105-124; Frisch, Ragnar, "Annual Survey of General Economic Theory: The Problem of Index Numbers," *Econometrica*, January 1930, pp. 1-38; Allen, R. G. D., "The Nature of Indifference Curves," *Review of Economic Studies*, February 1934, pp. 110-121; and Staehle, Hans, "A Development of the Economic Theory of Price Index Numbers," *Review of Economic Studies*, June 1936, pp. 163-188.

<sup>6</sup> The "wholesale" prices of capital equipment are here assumed to represent final cost levels. Generally speaking, this is true. The buyer of a capital good does not ordinarily purchase it from a retail outlet, but either from the manufacturer directly or from a wholesale house. A considerable portion of expenditures for farm machinery and implements and for business motor vehicles does take place in retail establishments, however.

Generally speaking, price quotations obtained from these two sources for corresponding commodities were combined in accordance with the 1935-36 expenditures of urban and rural populations, respectively, for the given items as developed in the National Resources Planning Board Study of Consumer Purchases.<sup>7</sup> To illustrate: The Bureau of Labor Statistics cost-of-living component for shoes was assigned the full weight of urban family expenditures for all shoes; similarly, the Bureau of Agricultural Economics prices-paid-by-farmers shoes component was weighted by rural and rural-nonfarm expenditures for all shoes.

For those commodities not represented separately in the classifications of the Bureau of Labor Statistics or

modities were not available from any of these diverse sources, the respective weights of such commodities were assigned to the prices of interrelated or closely analogous commodities.

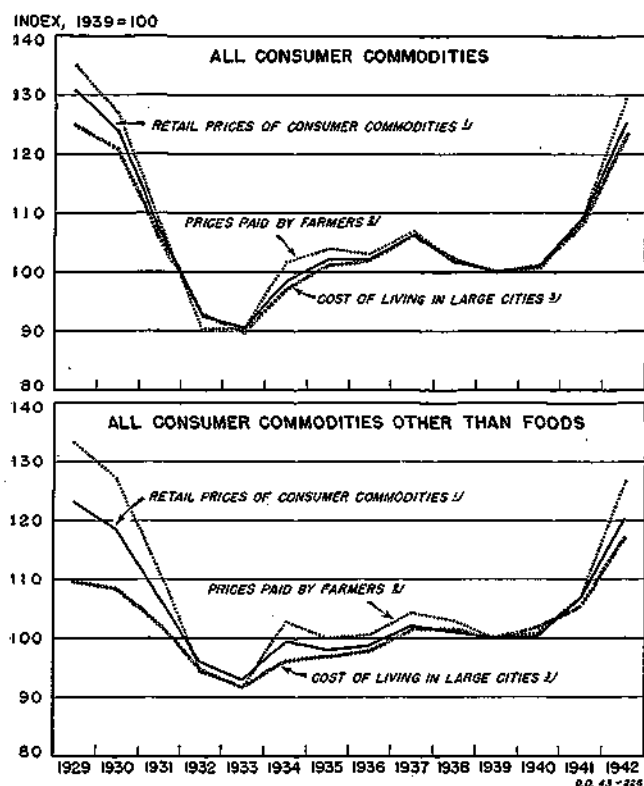
The wholesale price consumer commodity indexes were based almost entirely upon data obtained from the Wholesale Price Division of the Bureau of Labor Statistics. This Division has on file several thousand additional wholesale price series not presently included in their published Index of Wholesale Prices but which were made available for the present study. This source, as well as data from the Bureau of Valuation of the Interstate Commerce Commission, was also employed in the construction of the capital equipment indexes.

A detailed description of the sources and prices included by minor commodity groups is given in the appendix.

The minor commodity group price indexes were constructed using fixed weights only (Laspeyre formula). The weights employed for both the wholesale and retail indexes were developed in the Bureau of Foreign and Domestic Commerce and were based on the 1939 expenditures for the individual commodities priced, related to total expenditures for finished commodities in that year.<sup>8</sup> There were 2 reasons for not computing variable weighted minor commodity price indexes (Paasche formula). First, reliable information regarding the relative importance of the individual components of the minor commodity groups was not available for the entire period covered. Secondly, because of the relative homogeneity of the minor groups, the use of fixed weights only seemed justifiable on grounds of expediency.

The major commodity group indexes are combinations of the minor commodity groups employing both fixed and variable weights.<sup>9</sup> The resulting two sets of indexes (shown at the bottom of tables 1, 2, and 3) were then averaged geometrically to obtain a set of Fisher's "ideal" indexes, which are shown in the body of the three tables. As mentioned above, such a procedure is permissible when the differences between the two indexes are not large. It should be noted, however, that the "ideal" indexes are ideal only to the extent that each minor commodity group is assumed to represent a homogeneous entity. It is not believed that the indicated "ideal" indexes differ significantly from

Chart 2.—Retail Prices of Consumer Commodities



<sup>1</sup> Computed by U. S. Department of Commerce; see text for details.

<sup>2</sup> U. S. Department of Agriculture index of prices paid by farmers for commodities used for family maintenance adjusted by the U. S. Department of Commerce to exclude building materials and shifted to a 1939 base.

<sup>3</sup> U. S. Department of Labor index of cost of goods purchased by wage earners and lower-salaried workers in large cities adjusted by the U. S. Department of Commerce to exclude services. This was done by eliminating rent, gas, and electricity and reducing the weight of the "Miscellaneous" component to its commodities only. The resultant series was then shifted to a 1939 base.

Bureau of Agricultural Economics, price data were obtained where possible from the relevant components of the Fairchild Retail Index, from the General Merchandise Office of Sears, Roebuck & Co., the mail-order catalogs of the latter company and of Montgomery Ward & Co., and from other sources as specified in the appendix. In cases where specific price quotations for given com-

<sup>8</sup> These weights correspond to the commodity values at manufacturers' prices as given in "The Output of Manufactured Commodities," Bureau of Foreign and Domestic Commerce, 1942.

<sup>9</sup> The variable weighted (Paasche formula) major commodity group indexes were derived in a somewhat unorthodox fashion but which yield identical results with those calculated in the "orthodox" manner: A set of wholesale and retail current dollar final cost estimates for the individual commodity groups from 1929 through 1942 (a revised version of the preliminary estimates presented by William. H. Shaw, op. cit., p. 16) were first deflated by their respective price indexes and then summated for the major groups; by dividing the major group current dollar totals by their deflated dollar totals, major group price indexes were thereby obtained. Thus, using this procedure, the individual minor commodity group indexes were automatically weighted by their relative importance for each year, resulting in the variable weighted indexes shown at the bottom of tables 1, 2, and 3.

those that would have been obtained had the minor commodity group indexes been computed both ways.

A comparison of the variable and fixed weighted indexes brings out several interesting points. For one thing, the differences between the two sets of composite indexes are small enough to suggest that the constancy of consumption patterns over the entire period 1929 through 1942 is a workable assumption. Secondly, the divergence appears to grow progressively greater with the time span between 1939 and the year compared. Thirdly, the deviations between the two sets are relatively greater for the consumer durable commodities than for the semidurable or perishable commodities. (See tables 1 and 2.) This variation in the deviations is explained by the more intense fluctuations in consumer expenditures for durable commodities and by the greater proportion of new commodities in the durables group—i. e., the influx of radios, refrigerators, electrical appliances, etc.

As suggested in chart 1, the index of wholesale consumer commodity prices fluctuated somewhat more intensely than the index of retail prices for the periods compared. This, however, does not negate the point made above, namely, that wholesale and retail type deflation should result in substantially the same deflated series if both indexes are equally accurate. The reason is that when the current value wholesale series is deflated and marked up by a constant percentage, its degree of fluctuation will be reduced. As noted in an earlier article,<sup>10</sup> the retail gross margins employed in estimating consumer expenditures for commodities were found to vary inversely with the business cycle. This was attributed in part to the relatively greater sensitivity of wholesale commodity prices than of retail. Thus, in order to obtain the same deflated series from the two methods of deflation for consumer commodity expenditures, it follows that the wholesale deflators should display wider cyclical swings than the retail deflators.

#### Comparisons With Other Indexes.

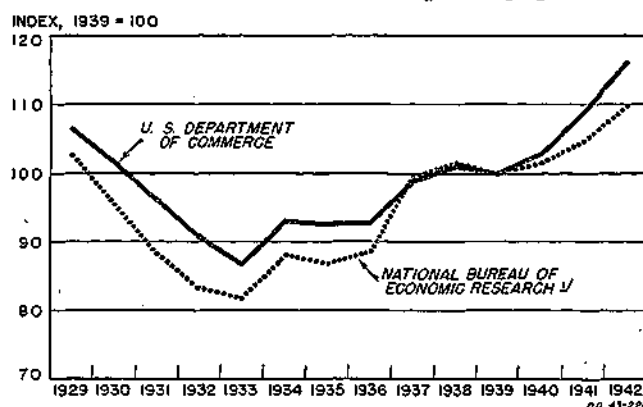
The annual movements of the consumer commodity retail price indexes presented here, and of the comparable segments of the Bureau of Labor Statistics index of cost of living and the Bureau of Agricultural Economics index of prices paid by farmers, are shown in chart 2. The various adjustments made in the latter two indexes, in order to exclude services and other items not included in the retail price consumer commodity index, are indicated in the footnotes to the chart.

As portrayed in the upper half of the chart, differences in the movements of the three indexes are small in some years but are large enough in others to affect significantly the deflation of commodity flow estimates. It may be seen in the lower half of the chart that the differences among the indexes are greater when the

heavily weighted food component is eliminated. This indicates that some of the individual components of the three indexes differ materially and that deflation of particular commodity flow segments require specifically designed price indexes.

A comparison of the capital equipment price index presented here with that of the National Bureau of Economic Research reveals substantial differences in movement (chart 3). It will be apparent from the chart that, although the present index is less influenced by cyclical variations from 1929 through 1939, the reverse is indicated from 1939 through 1942. This may be explained by the fact that the National Bureau of Economic Research index is heavily weighted by semimanufactured goods which enter into the construction of capital equipment,<sup>11</sup> whereas the present capital equipment price index includes the prices of finished commodities only. Thus, the greater sensitivity of the former index from 1929 to 1939 may be attributed to

Chart 3.—Wholesale Prices of Capital Equipment



<sup>1</sup> Shifted to a 1939 base by the U. S. Department of Commerce.

the inclusion of semimanufactured commodity prices which are known to vary with greater amplitude than prices of finished goods. The reverse situation, with the National Bureau of Economic Research index rising less rapidly than the present capital equipment series from 1939 through 1942, is undoubtedly due to the imposition of price ceilings on raw and semimanufactured goods (metals, etc.) during 1940. Price ceilings on machinery were not imposed until October of 1941 and early 1942.

#### Conceptual Limitations of Real Product Estimates.

The correction for price changes of current value commodity flow has not been included here because final current value estimates are not yet complete. Before concluding the present article, it is well to mention briefly the major difficulties that may arise in interpreting changes in real product estimates.

It is commonly recognized that the ultimate objective in measuring the real flow of national product is for

<sup>10</sup> Cf. Fowler, Bruce M., and Shaw, William H., "Distributive Costs of Consumption Commodities," *Survey of Current Business*, July 1942, p. 14.

<sup>11</sup> This index is based entirely on the Bureau of Labor Statistics index of wholesale prices; for a description of its components, cf. Mills, F. C., "Prices in Recession and Recovery," National Bureau of Economic Research, 1936, pp. 470-490.

Table 1.—Retail Price Deflators for Consumer Commodities by Minor Groups, 1929-42

[1939=100]

Commodity and commodity group	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942 <sup>1</sup>
All consumer commodities <sup>2</sup> .....	136.8	123.9	106.9	92.5	90.3	98.7	102.1	102.2	106.1	101.7	100.0	101.1	109.2	125.4
Consumer perishable commodities <sup>2</sup> .....	131.5	124.5	105.6	92.2	89.9	98.1	104.4	104.1	107.8	101.8	100.0	100.8	109.2	124.8
1. All foods.....	138.9	130.6	106.8	88.3	87.4	97.5	106.6	105.2	110.5	102.2	100.0	101.0	111.7	120.8
1a. Manufactured foods and kindred products.....	134.7	124.0	103.3	85.4	84.0	95.5	103.8	106.6	111.0	102.3	100.0	100.2	111.4	120.5
2a. Nonmanufactured foods.....	147.1	143.9	113.8	94.2	94.2	102.0	102.1	105.2	109.5	102.1	100.0	103.0	112.3	133.7
3. Cigars, cigarettes, tobacco and smoking supplies.....	140.2	103.8	105.9	105.9	93.7	96.9	96.0	95.4	97.8	98.6	100.0	102.6	104.6	107.5
4. Drug preparations and household medical sundries.....	118.5	117.8	115.9	111.4	105.5	101.5	98.9	97.9	99.7	99.4	100.0	99.8	101.0	105.3
5. Toilet preparations and sundries.....	128.0	127.2	121.9	119.7	110.4	102.6	97.4	96.5	98.6	99.8	100.0	100.0	101.7	113.6
6. Cleaning and polishing preparations.....	119.6	122.9	108.3	94.4	91.4	91.5	100.2	98.7	100.0	97.8	100.0	99.1	100.7	107.2
7. Magazines, newspapers, and other printed matter.....	101.0	99.8	99.0	97.7	95.4	95.5	95.0	96.9	97.3	99.6	100.0	100.4	100.2	102.7
8. Stationery and writing supplies.....	127.2	123.9	105.9	100.9	87.2	89.9	86.4	88.1	99.3	100.6	100.0	104.3	104.3	124.1
9. Miscellaneous household paper products.....	158.5	150.5	146.8	128.1	128.2	127.6	106.5	103.0	100.7	101.9	100.0	99.6	102.4	125.6
10. Toys, games, and sport supplies.....	101.7	101.0	93.8	94.7	93.9	96.2	93.0	97.7	99.7	100.5	100.0	104.4	106.8	115.3
11. Manufactured household illuminating and heating products.....	116.2	112.3	93.5	91.5	91.4	103.6	99.5	100.2	105.3	103.2	100.0	99.6	103.4	111.7
12. Nonmanufactured household fuels.....	129.4	118.4	112.8	102.1	98.4	102.0	100.9	100.6	100.3	100.4	100.0	102.0	107.4	113.7
13. Gasoline and oil.....	115.4	108.5	91.3	96.4	95.7	100.7	100.7	103.8	103.8	103.8	100.0	98.1	103.1	108.3
Consumer semidurable commodities <sup>2</sup> .....	128.3	122.3	108.1	89.3	89.0	102.2	100.4	100.8	105.0	101.5	100.0	101.6	109.0	128.2
14. Clothing and accessories.....	124.8	120.3	106.8	87.7	87.8	102.1	99.0	100.4	104.6	101.3	100.0	101.7	109.4	129.6
15. Shoes and other footwear.....	136.4	129.3	112.0	94.3	91.3	99.3	96.9	97.2	101.0	101.3	100.0	100.9	105.0	116.8
16. Personal furnishings.....	122.3	115.0	107.0	94.6	93.7	99.1	101.6	100.7	103.2	99.7	100.0	102.7	107.4	119.8
17. Dry goods and notions.....	147.2	127.8	114.6	92.2	93.9	109.2	106.7	106.0	103.5	102.4	100.0	102.5	113.6	138.3
18. Semidurable house furnishings.....	128.5	124.3	106.3	87.4	85.5	105.4	106.7	106.8	112.2	102.2	100.0	101.3	110.4	134.2
19. Semidurable toys and sporting goods.....	119.5	119.5	112.2	97.2	93.6	100.6	99.9	106.9	114.3	109.2	100.0	99.6	107.4	129.9
Consumer durable commodities <sup>2</sup> .....	131.7	123.8	110.5	97.8	93.4	97.1	95.4	96.7	100.9	101.2	100.0	101.8	109.1	124.8
20. Household furniture.....	149.4	142.6	119.2	96.4	95.2	103.9	96.9	98.2	105.7	102.0	100.0	100.2	109.1	126.9
21. Floor coverings.....	118.0	118.4	104.7	86.5	86.8	98.7	99.5	100.4	107.8	100.3	100.0	105.6	113.8	125.4
22. Miscellaneous durable house furnishings and equipment.....	123.1	118.2	99.0	85.8	87.1	96.5	93.8	96.8	102.5	100.4	100.0	103.2	110.5	125.4
23. Heating and cooking apparatus.....	133.4	127.9	122.9	106.4	104.2	101.9	107.4	104.6	101.1	105.4	100.0	104.4	112.0	131.0
24. Refrigerators, washing machines and sewing machines.....	141.4	134.8	121.7	102.6	92.6	93.2	94.3	94.0	100.0	102.5	100.0	91.5	94.3	108.0
25. Miscellaneous electrical household appliances.....	152.1	145.6	139.9	129.2	113.6	108.9	98.8	99.5	99.7	101.2	100.0	99.1	103.3	114.5
26. China, glassware, tableware and household utensils.....	123.4	110.3	105.2	92.4	89.4	93.9	94.8	97.9	102.3	100.3	100.0	101.5	106.5	120.3
27. Radio apparatus and phonographs.....	330.7	234.1	159.1	111.7	100.9	103.1	100.3	106.1	103.8	105.0	100.0	98.1	102.6	116.9
28. Pianos.....	123.3	114.6	104.8	98.8	89.3	89.4	91.1	92.4	99.9	99.2	100.0	101.8	105.9	122.8
29. Other musical instruments.....	128.7	116.4	108.5	103.3	104.2	112.8	103.3	104.1	108.5	101.5	100.0	111.1	116.7	151.4
30. Clocks and watches.....	125.4	125.4	118.8	113.5	111.4	85.7	84.5	86.7	90.9	92.1	100.0	111.2	114.9	142.3
31. Jewelry and sterling silverware.....	119.7	116.7	114.7	104.5	104.8	112.7	108.9	118.3	118.8	100.5	100.0	104.2	123.4	158.5
32. Books and other durable printed matter.....	116.2	112.7	107.3	103.1	96.8	96.0	95.2	96.1	97.9	99.0	100.0	99.7	101.3	101.3
33. Writing equipment.....	102.6	103.1	103.1	101.8	101.6	100.3	100.8	101.1	101.8	101.9	100.0	100.6	101.7	105.6
34. Ophthalmic products and surgical and orthopedic appliances.....	106.2	106.2	105.1	101.1	97.5	98.2	98.2	98.9	100.0	99.6	100.0	101.3	101.3	108.5
35. Monuments and tombstones.....	116.9	107.8	110.0	110.2	110.4	117.4	120.4	112.8	112.8	105.4	100.0	112.2	112.2	112.2
36. Luggage.....	135.3	134.2	118.2	90.3	91.6	105.6	102.1	100.3	108.7	103.3	100.0	102.2	108.5	126.7
37. Wheel goods, durable toys and sport equipment.....	131.0	131.5	124.5	110.0	103.1	104.1	101.5	95.1	98.9	102.2	100.0	104.0	109.7	123.9
38. Passenger cars.....	109.1	104.0	99.1	97.1	85.9	89.6	88.4	90.6	94.9	102.2	100.0	102.5	113.2	130.7
39. Replacement tires and tubes.....	95.8	93.6	81.6	75.3	82.1	82.0	84.9	83.7	93.7	96.0	100.0	103.8	106.7	136.9
40. Passenger car replacement parts and accessories.....	140.3	131.7	112.4	103.3	99.6	104.0	100.9	101.2	103.0	97.3	100.0	105.4	112.6	133.7
41. Pleasure craft.....	109.5	105.4	100.2	93.1	92.4	92.5	90.7	88.8	90.6	95.3	100.0	102.1	102.1	114.6

<sup>1</sup> Preliminary.<sup>2</sup> Fisher "Ideal" Indexes (see text). The corresponding variable and fixed weighted indexes are as follows:

	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942
All consumer commodities:														
Variable weighted index.....	129.9	123.6	106.9	92.4	90.2	98.7	102.0	102.1	105.9	101.7	100.0	101.1	109.2	125.3
Fixed weighted index.....	131.8	124.3	107.0	92.7	90.4	98.8	102.3	102.4	106.3	101.7	100.0	101.2	109.2	125.5
Consumer perishable commodities:														
Variable weighted index.....	131.2	124.4	105.7	92.3	90.0	98.1	104.3	104.1	107.8	101.9	100.0	100.8	109.2	124.8
Fixed weighted index.....	131.8	124.7	105.6	92.1	89.9	98.1	104.5	104.2	107.9	101.8	100.0	100.8	109.2	124.5
Consumer semidurable commodities:														
Variable weighted index.....	128.4	122.3	108.2	89.4	89.1	102.2	100.4	100.8	105.0	101.5	100.0	101.6	109.0	128.1
Fixed weighted index.....	128.2	122.3	108.1	89.3	89.0	102.3	100.5	100.9	105.1	101.5	100.0	101.6	109.0	128.4
Consumer durable commodities:														
Variable weighted index.....	127.8	122.4	109.6	97.0	93.0	96.7	95.0	96.3	100.5	101.2	100.0	101.8	109.0	123.7
Fixed weighted index.....	135.8	125.2	111.5	98.7	93.8	97.6	95.9	97.1	101.4	101.3	100.0	101.9	109.3	125.9

the light shed upon changes in economic well-being. When such estimates are used for that purpose, it is necessary to take account of certain limitations inherent in quantitative measures. These limitations stem from the fact that a quantitative measure cannot be adequate in appraising a change in the economic status of society when that change is essentially qualitative.

In the first place, a change in real product does not provide a direct measure of the change in economic welfare when the distribution of income has also changed. It only indicates, in such cases, what welfare change would be feasible if the income distribution were unchanged. The reason for this limitation is,

of course, the fact that there is no accurate common denominator for comparing satisfactions among individuals. While simplifying assumptions are often adequate in problems of economic policy, there is no exact theoretical solution of this difficulty. It may be pointed out, however, that changes in the distribution of income are ordinarily not revolutionary and, furthermore, that a measure of real product has a wide area of usefulness even within the more limited interpretation of its meaning.<sup>12</sup>

<sup>12</sup> For a thoroughgoing analysis of this factor, as well as others related to it, cf. Hicks, J. R., "The Foundations of Welfare Economics," *The Economic Journal* (London), December 1939, pp. 696-712.

Table 2.—Wholesale Price Deflators for Consumer Commodities by Minor Groups, 1929-42

[1939=100]

Commodity and commodity group	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942 <sup>1</sup>
All consumer commodities <sup>2</sup>	128.6	110.9	100.9	87.6	86.5	97.7	106.3	106.2	112.7	102.6	100.0	101.7	114.2	132.6
Consumer perishable commodities <sup>2</sup>	124.3	124.4	102.3	88.8	85.3	97.7	112.1	111.1	117.8	103.6	100.0	100.9	115.6	135.2
1. All foods	141.8	129.8	103.2	85.4	83.2	97.5	116.4	114.2	122.3	104.1	100.0	100.4	117.9	141.4
1a. Manufactured foods and kindred products	136.2	122.1	100.8	84.3	84.1	97.7	119.5	115.3	122.4	104.4	100.0	99.4	116.2	136.5
2a. Nonmanufactured foods	152.5	145.2	107.8	87.3	81.7	97.0	110.2	111.9	122.1	103.5	100.0	102.7	121.8	154.0
3. Cigars, cigarettes, tobacco and smoking supplies	107.2	110.0	109.8	108.3	92.3	98.8	98.7	98.7	100.1	100.0	100.0	101.0	103.2	104.3
4. Drug preparations and household medical sundries	85.4	81.6	75.7	70.3	69.8	95.7	98.2	102.4	110.7	101.0	100.0	113.7	134.4	171.1
5. Toilet preparations and sundries	123.5	121.7	124.7	110.8	97.3	90.5	94.4	95.3	103.0	103.8	100.0	99.4	107.1	119.0
6. Cleaning and polishing preparations	114.0	113.1	105.1	94.6	95.1	93.7	100.5	101.3	103.3	100.7	100.0	97.4	103.4	117.5
7. Magazines, newspapers, and other printed matter	98.9	98.1	95.3	94.6	92.5	91.1	94.4	97.1	97.5	99.1	100.0	100.0	100.5	103.0
8. Stationery and writing supplies	113.1	112.2	99.2	93.8	82.7	87.2	83.3	86.3	98.6	100.3	100.0	104.2	104.3	125.0
9. Miscellaneous household paper products	120.2	114.9	114.0	107.7	105.5	110.7	100.9	99.6	104.3	103.4	100.0	102.8	107.2	122.4
10. Toys, games, and sport supplies	102.5	101.2	95.4	95.5	94.9	95.8	101.6	98.5	101.6	101.6	100.0	103.9	106.8	176.1
11. Manufactured household illuminating and heating products	123.9	111.8	87.4	92.9	93.0	104.6	102.3	100.9	109.4	108.6	100.0	101.5	114.2	125.3
12. Nonmanufactured household fuels	109.9	107.9	105.1	101.1	97.2	102.3	102.7	104.2	102.7	104.1	100.0	102.3	108.7	116.2
13. Gasoline and oil	162.8	135.3	89.8	100.8	91.3	102.9	103.1	117.1	120.9	108.9	100.0	104.0	117.9	123.5
Consumer semidurable commodities <sup>2</sup>	118.1	110.8	95.9	81.4	90.0	101.1	99.2	100.4	107.0	100.1	100.0	103.4	112.6	130.2
14. Clothing and accessories	115.3	108.8	93.7	78.3	88.0	103.5	98.0	99.5	106.8	100.7	100.0	103.3	111.2	128.8
15. Shoes and other footwear	104.7	101.0	92.3	84.5	89.1	95.7	95.4	97.3	102.0	99.5	100.0	105.2	110.7	122.7
16. Personal furnishings	121.1	115.7	114.1	103.0	98.7	101.4	101.2	102.3	105.0	100.4	100.0	102.9	107.5	120.0
17. Dry goods and notions	133.3	138.5	108.9	89.8	100.6	107.9	105.6	102.9	108.7	98.3	100.0	104.7	127.6	149.4
18. Semidurable house furnishings	108.7	127.9	108.1	90.1	102.2	116.5	114.6	112.7	116.8	100.3	100.0	101.3	119.2	148.2
19. Semidurable toys and sporting goods	119.5	119.5	111.2	99.4	91.4	99.1	100.1	106.8	115.5	110.3	100.0	99.6	107.6	130.2
Consumer durable commodities <sup>2</sup>	121.0	113.4	101.9	91.4	87.3	92.9	91.9	94.0	99.9	100.9	100.0	102.5	110.2	123.1
20. Household furniture	112.7	109.8	101.0	88.1	91.3	97.7	95.6	98.7	107.1	101.8	100.0	102.0	111.6	126.0
21. Floor coverings	105.8	106.0	91.6	79.7	83.0	90.0	91.4	91.8	102.0	98.2	100.0	108.7	112.6	117.7
22. Miscellaneous durable house furnishings and equipment	119.4	108.5	91.1	79.0	89.8	101.8	97.5	100.0	110.8	101.2	100.0	104.3	113.8	133.5
23. Heating and cooking apparatus	107.2	105.3	99.5	88.7	81.3	84.1	85.7	89.0	97.9	95.9	100.0	100.5	107.7	119.3
24. Refrigerators, washing machines, and sewing machines	150.2	144.9	136.3	109.0	93.3	95.4	95.3	91.2	101.0	102.6	100.0	95.0	97.6	106.0
25. Miscellaneous electrical household appliances	158.4	151.4	145.2	133.6	118.7	113.0	102.9	99.4	99.6	100.5	100.0	100.0	110.6	125.2
26. China, glassware, tableware and household utensils	99.1	90.0	87.7	82.5	82.8	83.4	92.2	95.0	101.5	100.0	100.0	101.7	105.9	117.7
27. Radio apparatus and phonographs	116.8	219.9	148.6	105.8	92.6	106.9	104.6	108.7	109.1	105.9	100.0	98.7	107.7	122.6
28. Pianos	123.3	114.6	104.8	98.8	89.9	89.4	91.1	92.4	99.9	99.2	100.0	101.8	105.9	122.8
29. Other musical instruments	123.7	115.4	108.5	103.3	104.2	112.8	103.3	104.1	108.5	101.5	100.0	111.1	110.7	151.4
30. Clocks and watches	230.0	228.7	117.8	112.9	103.8	79.0	86.9	90.8	98.0	92.2	100.0	110.8	115.3	142.7
31. Jewelry and sterling silverware	107.2	91.8	77.7	65.9	71.2	92.2	98.3	108.0	105.9	97.0	100.0	107.9	115.2	139.7
32. Books and other durable printed matter	107.9	105.9	102.0	97.8	87.7	87.6	83.1	93.6	95.2	98.6	100.0	99.5	103.0	103.6
33. Writing equipment	102.6	103.1	103.1	101.8	101.6	100.3	100.8	101.1	101.8	101.9	100.0	100.6	101.7	105.6
34. Ophthalmic products and surgical and orthopedic appliances	100.1	100.4	99.2	97.7	95.6	97.3	97.3	98.2	99.4	99.6	100.0	100.0	101.3	103.3
35. Monuments and tombstones	127.3	122.6	119.1	108.9	94.3	99.5	107.4	102.8	98.9	106.4	100.0	100.9	113.9	119.1
36. Luggage	105.1	104.3	91.9	80.3	75.7	85.8	81.0	87.6	106.2	102.8	100.0	103.5	118.1	140.9
37. Wheel goods, durable toys and sport equipment	106.9	104.8	100.6	94.3	93.1	98.4	95.5	97.2	102.0	102.4	100.0	98.9	103.5	119.1
38. Passenger cars	111.7	105.0	100.4	98.1	85.4	89.6	87.7	90.2	94.3	102.4	100.0	103.8	114.0	125.3
39. Replacement tires and tubes	90.8	85.0	74.8	63.2	68.3	74.2	75.3	77.9	92.9	96.7	100.0	98.5	104.0	123.6
40. Passenger car replacement parts and accessories	139.2	130.6	110.3	101.0	98.2	102.3	99.9	98.7	100.4	97.1	100.0	103.5	110.3	130.9
41. Pleasure craft	109.5	105.4	100.2	93.1	92.4	92.5	90.7	88.8	96.6	98.3	100.0	102.1	102.1	114.6

<sup>1</sup> Preliminary.<sup>2</sup> Fisher "Ideal" Indexes (see text). The corresponding variable and fixed weighted indexes are as follows:

	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942
All consumer commodities:														
Variable weighted index	126.9	119.2	100.6	87.3	80.2	97.6	105.8	105.9	112.3	102.6	100.0	101.7	114.0	132.4
Fixed weighted index	130.4	120.6	101.3	87.9	86.8	97.8	106.9	106.0	113.2	102.6	100.0	101.7	114.4	132.9
Consumer perishable commodities:														
Variable weighted index	133.7	124.2	102.4	88.8	85.2	97.7	111.8	111.0	117.7	103.6	100.0	100.9	115.5	134.8
Fixed weighted index	135.0	124.6	102.3	88.9	85.5	97.8	112.4	111.3	118.0	103.6	100.0	101.0	115.8	135.7
Consumer semidurable commodities:														
Variable weighted index	117.4	110.3	95.5	81.1	89.8	100.8	99.0	100.3	106.9	100.1	100.0	103.4	112.5	130.0
Fixed weighted index	119.9	111.4	96.3	81.7	90.3	101.4	99.4	100.6	107.1	100.1	100.0	103.5	112.7	130.5
Consumer durable commodities:														
Variable weighted index	117.4	112.0	100.3	89.5	86.7	92.5	91.5	93.8	99.5	100.8	100.0	102.5	110.1	122.6
Fixed weighted index	124.7	114.8	103.5	93.3	87.9	93.3	92.3	94.3	100.3	101.0	100.0	102.6	110.3	123.6

In the second place, it is possible to pass from an indicated change in real product to a change in economic welfare only if the wants of society have remained relatively constant. In times of peace this assumption can usually be made with assurance over periods of even quite a few years, although over long periods it may become questionable. However, when a change from peace to war is involved, as with comparisons over the past few years, the change in the structure of wants, particularly as reflected in the changes of consumption patterns, may become so drastic as to impair seriously the meaning of quantitative comparisons of economic welfare.

Thirdly, since the real national product counts only the output of economic enterprises it may fail to indicate welfare changes adequately because of variations in other areas. The most important of such possible variations may occur in a shift from the household to the market economy or in a marked change in the sacrifices involved in producing the aggregate output. Both the services of the household and of leisure are important factors in assessing economic welfare though it is not possible to include them in the measure of real national product. Ordinarily they change but slowly—apart from forced leisure which may hardly be construed as a contribution to welfare—and can safely



Table 3.—Wholesale Price Deflators for Capital Equipment by Minor Groups, 1929-42

	{1939=100}													
Group	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942
Capital equipment, total <sup>2</sup>	106.3	101.4	99.0	90.5	86.6	92.9	92.8	92.6	98.9	100.9	100.0	102.6	108.9	115.9
42. Industrial machinery	93.8	90.1	87.4	84.8	85.3	93.3	93.4	94.1	100.1	99.7	100.0	101.6	107.6	110.8
43. Mining machinery	90.8	88.4	86.1	81.0	83.8	80.6	89.7	89.7	99.8	99.8	100.0	105.1	110.8	114.7
44. Construction machinery	89.0	86.8	83.9	78.9	81.2	85.9	89.0	89.0	99.5	99.5	100.0	105.2	112.1	115.5
45. General and miscellaneous machinery and equipment	104.3	100.8	97.1	86.4	83.1	91.1	91.3	88.9	100.9	101.3	100.0	101.0	109.9	115.6
46. Engines and turbines	106.1	105.8	104.8	94.7	89.2	98.3	97.7	95.7	99.8	99.8	100.0	102.9	107.0	114.2
47. Pumps and pumping equipment	104.3	104.0	102.1	102.2	95.2	95.5	92.5	93.1	99.1	100.3	100.0	102.5	112.3	123.0
48. Machine tools	96.4	98.9	83.6	78.3	78.3	87.1	87.1	87.1	96.4	98.2	100.0	107.5	115.5	117.0
49. Electrical apparatus and equipment	130.5	114.6	103.1	94.8	92.5	100.9	98.9	97.9	101.3	101.9	100.0	102.7	104.9	114.3
50. Farm machinery and equipment	101.0	94.8	92.7	85.2	84.2	94.5	97.6	98.6	97.3	100.0	100.0	99.7	101.8	105.5
51. Tractors	110.8	110.0	104.5	98.0	96.7	98.0	101.4	101.9	105.1	104.2	100.0	97.2	97.0	102.1
52. Office machinery	118.4	118.4	115.9	114.5	100.4	101.8	103.8	104.0	103.3	99.2	100.0	101.3	101.8	110.0
53. Nonresidential furniture and equipment	112.9	112.5	105.3	96.3	89.6	94.8	91.5	91.2	100.3	99.0	100.0	103.4	113.6	125.7
54. Durable containers	88.8	88.3	76.9	73.4	79.4	80.2	86.4	86.4	104.9	103.1	100.0	100.1	105.4	109.8
55. Professional and scientific equipment	132.3	128.3	128.4	125.9	114.7	112.5	107.5	106.1	105.5	105.5	100.0	101.6	105.9	135.7
56. Tools	96.6	94.8	89.6	87.3	85.0	89.9	88.4	89.3	97.7	100.1	100.0	99.6	102.9	108.3
57. All other subsidiary durable equipment	109.8	102.9	93.7	80.6	85.0	87.8	98.1	97.2	106.0	101.0	100.0	103.0	110.9	116.5
58. Business motor vehicles	112.3	105.7	99.5	97.1	85.8	80.8	87.2	85.5	93.0	101.6	100.0	101.4	111.6	120.8
59. Motorcycles	84.6	84.6	84.6	85.5	84.6	84.6	85.0	85.4	98.0	100.0	100.0	101.4	101.8	102.6
60. Locomotives and railroad cars	97.6	96.6	80.1	78.8	77.8	87.1	92.4	93.2	98.8	98.8	100.0	102.9	109.9	120.0
61. Ships and boats	96.9	94.9	92.1	84.8	84.8	90.8	93.7	93.7	100.3	100.3	100.0	103.0	109.9	120.0

<sup>1</sup> Preliminary.<sup>2</sup> Fisher "Ideal" Indexes (see text). The corresponding variable and fixed weighted indexes are as follows:

	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942
Variable weighted index	105.8	101.0	95.7	90.0	86.2	92.7	92.0	92.4	98.8	100.9	100.0	102.7	109.0	115.4
Fixed weighted index	106.9	101.8	96.3	91.0	87.0	93.1	92.7	92.9	99.1	100.9	100.0	102.6	108.9	116.4

be ignored in comparing welfare over short periods. But in times such as the present, both of these elements may have changed drastically and consequently must be considered in any appraisal of our economic position from a welfare standpoint.

### Appendix

The following notes indicate briefly the composition of the minor commodity group indexes with respect to the specific price data used and sources thereof. The retail price index for one of the consumer commodity minor groups, Group 16—Personal Furnishings, was obtained indirectly by marking up the wholesale price index for that group by appropriate annual retail mark-up factors; as indicated in the notes below, several of the wholesale price indexes were obtained in a similar manner, by deflating the comparable retail price indexes by the detailed annual retail mark-up factors developed in the commodity flow study.

Those price series below followed by an asterisk (\*) represent unpublished data. The Bureau of Labor Statistics and the Bureau of Agricultural Economics will hereafter be referred to as "B. L. S." and "B. A. E.," respectively.

#### TABLES 1 AND 2—CONSUMER COMMODITIES AT WHOLESALE AND AT RETAIL

##### Perishables.

1a. *Manufactured foods and kindred products.* Wholesale—The B. L. S. wholesale price composite for all foods, adjusted to exclude nonmanufactured foods. Retail—The B. L. S. retail price composite for all foods, adjusted to exclude nonmanufactured foods.

2a. *Nonmanufactured foods.* Wholesale—United States Department of Agriculture, Agricultural Marketing Service, milk dealers' average buying price of standard grade milk. B. A. E. prices received by farmers' indexes for the following: Fruits; truck crops; chickens and eggs, and meat animals. Retail—B. L. S. retail price indexes for the following: Fresh fruits and vegetables; dried fruits and vegetables; poultry; fresh fluid milk, delivered; and meat products adjusted to exclude poultry.

3. *Cigars, cigarettes, tobacco, and smoking supplies.* Wholesale—B. L. S. wholesale price indexes for the following: Cigarettes; cigars; plug tobacco; smoking tobacco; and snuff. Retail—B. L. S. retail price data for the following were used from 1935 to 1942: Cigars; cigarettes; and pipe tobacco. For the earlier years the National Industrial Conference Board composite index for cigars, cigarettes, and pipe tobacco was spliced with the above.

4. *Drug preparations and household medical sundries.* Wholesale—The B. L. S. wholesale price index for drugs and pharmaceuticals. Retail—B. L. S. retail price data for the following: Nonnarcotic prescriptions, liquid, 4 oz.; nonnarcotic prescriptions, capsules; narcotic prescriptions, 3 oz.; cold remedy; castor oil; quinine tablets; milk of magnesia, widely and not widely advertised (2 series); and aspirin tablets. Mail order catalog prices for the following: Antiseptic mouth wash; epsom salts; healing ointment; cold tablets; cough syrup; laxatives; and sanitary napkins (2 series).

5. *Toilet preparations and sundries.* Wholesale—B. L. S. wholesale price indexes for the following: Toilet soap, bars and cakes, composite; single edge razor blades; and double edge razor blades. Retail—B. L. S. retail price data for the following:

Toilet soap; shaving cream; toothpaste; face powder, low and medium priced, (2 series); cleansing cream; and razor blades. The B. A. E. prices paid by farmers price series for toilet soap. Mail order catalog prices for the following: Razor blades, single and double edge (2 series); after-shave lotion; hair tonic; talcum powder; lipstick (2 series); perfumes (3 series).

6. *Cleaning and polishing preparations.* Wholesale—B. L. S. wholesale price indexes for the following: Laundry soap bars, white, composite; laundry soap bars, yellow, composite; soap cleansers, packaged, composite; soap chips and flakes, packaged, composite; powdered or granulated soap; auto polish, 2 series; furniture polish; furniture wax; and calcium arsenate disinfectant. Retail—B. A. E. prices paid by farmers data for laundry soap and laundry starch. B. L. S. retail price data for the following: Soap cleanser; laundry soap bars, white; laundry soap bars, yellow; and soap flakes and chips, fine and general purpose (2 series). Also, a mail order catalog price for a disinfectant.

7. *Magazines and newspapers.* Wholesale—Retail index deflated to wholesale level (see prefatory note). Retail—The National Industrial Conference Board composite index for newspapers and magazines.

8. *Stationery and writing supplies.* Wholesale—Retail index deflated to wholesale level (see prefatory note). Retail—Mail order catalog prices for the following: White bond paper stationery; personal and social calling cards (2 series); personal stationery sets, including sheets and envelopes; and white bond envelopes.

9. *Miscellaneous household paper products.* Wholesale—B. L. S. wholesale price indexes for white tissue paper and wrapping paper. These were combined with the retail index deflated to wholesale level (see prefatory note). Retail—Mail order catalog prices for toilet paper; cleansing tissues; waxed paper (2 series); paper towels; paper forks and spoons; and paper cups (2 series). The B. L. S. retail price series for toilet paper\* was also used.

10. *Toys, games, and sport supplies.* Wholesale—Retail index deflated to wholesale level (see prefatory note). Retail—Mail order catalog prices for the following: Playing cards (4 series); bullets and cartridges (3 series); set of dominoes (2 series); ouija board; checkerboard and checker set; official baseball; cartridge roll film for box cameras (2 series); combination-57-games set; and miscellaneous children's games and toy sets (4 series). Also included were B. L. S. wholesale price series for golf balls\* and tennis balls.\*

11. *Manufactured household illuminating and heating products.* Wholesale—B. L. S. wholesale price indexes for the following: Regular matches, composite; incandescent lamps, 40, 60, and 100 watts; fuel oil, Oklahoma; kerosene, New York; kerosene, refinery; and coke, composite. Retail—B. L. S. retail price data for fuel oil, number 2 grade, composite, and for coke; as both of these series were available from 1937 only, the earlier years were obtained by linking on the wholesale price indexes for both products. Included also were the B. A. E. prices paid by farmers index for kerosene\* and B. L. S. retail price data for household matches, in boxes, and electric light bulbs.\*

12. *Nonmanufactured household fuels.* Wholesale—B. L. S. wholesale price composite indexes for anthracite and bituminous coal. Retail—B. L. S. retail price data for the following: Anthracite, stove, composite; anthracite, chestnut, composite; and bituminous coal, composite. Included also were the following B. A. E. prices paid by farmers' series: Firewood, per cord; bituminous coal; and anthracite, chestnut.\*

13. *Gasoline and oil.* Wholesale—B. L. S. wholesale price indexes for the following: Gasoline, Oklahoma, California, North Texas, and Pennsylvania (5 series); cylinder oil, Oklahoma and Pennsylvania; and neutral oil, Gulf coastal and Pennsylvania. Retail—The American Petroleum Institute 50-city service station gasoline price, in-

cluding taxes, combined with the B. A. E. prices paid by farmers index of gasoline, regular, including tax.\*

#### Semidurables.

14. *Clothing and accessories.* Wholesale—B. L. S. wholesale price indexes for the following: Clothing group, composite; hosiery and underwear group, composite; gloves, leather, men's; gloves, leather, women's. Also included were the Fairchild retail composite for women's furs and women's aprons and house dresses. Retail—Fairchild retail price composites for the following: Men's hosiery; men's underwear; men's shirts and neckwear; men's hats and caps; other men's clothing, including overalls; infants' wear, socks and underwear; women's hosiery; women's aprons and house dresses; women's corsets and brassieres; women's furs; and women's underwear. Inasmuch as the Fairchild indexes were not available for 1929 and 1930, these years were estimated by linking the 1931 Fairchild combined index to that of the B. L. S. cost of living index for all clothing. The resulting index was then combined with the B. A. E. prices paid by farmers index for clothing, adjusted to exclude all shoes.

15. *Shoes and other footwear.* Wholesale—B. L. S. wholesale price indexes for the following: The shoe group, composite; rubber boots, men's, 2 series; rubber gaiters, men's, 2 series; rubber gaiters, women's; and men's rubbers. Retail—Fairchild retail composite for women's shoes, men's shoes, and infants' shoes combined with the B. A. E. prices paid by farmers indexes for men's workshoes, men's knee boots, and women's shoes or oxfords.\*

16. *Personal furnishings.* Wholesale—B. L. S. wholesale price indexes for the following: Ladies' umbrellas; men's umbrellas; safety razors, single edge, 2 series; safety razors, double edge, 2 series; artificial leather, light; and other leather products, composite. Retail—Wholesale index marked up to retail level (see prefatory note).

17. *Dry goods and notions.* Wholesale—B. L. S. wholesale price indexes for the following: Cotton goods, composite, adjusted to exclude sheetings, shirtings, tickings, tire fabrics and yarns; silk and rayon, composite; woolen and worsted goods, composite, adjusted to exclude yarns; cotton thread; handkerchiefs, cotton, men's and women's; and handkerchiefs, linen, men's and women's. Retail—Fairchild retail composite for silk, woolen and cotton piece goods; the B. A. E. prices paid by farmers index for muslin; and mail order catalog prices for diapers, cotton sewing thread, and linen crash goods.

18. *Semidurable house furnishings.* Wholesale—B. L. S. wholesale price indexes for the following: Toweling; oilcloth, shelf, table and wall; tablecloths, cotton damask; tablecloths, mercerized; pillowcases; bedsheet; sheetings, 2 series; and prepared household paints, 2 series. Retail—B. L. S. retail price data for household brooms, 2 series; towels; and marquise curtains, 3 series.\* B. A. E. prices paid by farmers data for household brooms; sheets and sheetings; and toweling.\* The Fairchild retail composite for household sheets and a mail-order catalog price series for house paints were also included.

19. *Semidurable toys and sporting goods.* Wholesale—Retail index deflated to wholesale level (see prefatory note). Retail—Mail-order catalog price series for the following: Doll buggy; ouija board; sled; set of boxing gloves; football; and a combination multiple game set. A B. L. S. wholesale price series for fishing line\* and a unit average price series for dolls derived from the *Census of Manufactures* were also included.

#### Durables.

20. *Household furniture.* Wholesale—B. L. S. wholesale price indexes for the following: Metal beds; wooden beds; benches; chairs; dressers and vanities; dining room buffets, diners, and servers; dining room set of six chairs, dining room tables; kitchen cabinets, chairs and tables; living room chairs, davenport and tables; mattresses, composite; and bed springs, coil. Retail—B. L. S. retail price data for the following: Living room suites, 2 series; dining room suites, 2 series; bedroom suites, 2 series; studio couches; bedsprings; and mattresses.\* B. A. E. prices paid by farmers data for the following: Bedsprings; bedsteads; dining chairs; dressers; kitchen cabinets; dining tables; living room suites; and mattresses.\*

21. *Floor coverings.* Wholesale—B. L. S. wholesale price indexes for the following: Axminster carpets, composite; Brussels carpets, composite; Wilton carpets, composite; felt base floor coverings, (2 series); and inlaid and plain linoleum, (2 series). Retail—B. L. S. retail price data for the following: Rugs, wool; carpets, wool; rugs, felt base; floor coverings, felt base; and linoleum, inlaid.\* Also included were the B. A. E. prices paid by farmers series for seamless rugs\* and linoleum,\* and mail order catalog prices for Axminster rugs and felt base rugs.

22. *Miscellaneous durable house furnishings and equipment.* Wholesale—B. L. S. wholesale price indexes for the following: Blankets, part wool; blankets, woolen; blankets, cotton; garden hose; comforters; scissors and shears; window shades mirrors; bathroom scales; and hand-operated lawn mowers, (2 series). Retail—Fairchild retail composite for blankets and comforters; B. L. S. retail price data for woolen blankets, (2 series),\* and part wool blankets;\* and B. A. E. prices paid by farmers series for cotton blankets\* and for comforters.\* Also included were mail-order catalog prices for garden hose, flashlight cases, and lawnmowers and the B. L. S. wholesale price series for scissors and shears,\* window shades, mirrors, and bathroom scales.\*

23. *Heating and cooking apparatus.* Wholesale—B. L. S. wholesale price composite indexes for coal cooking stoves, electric cooking stoves, gas cooking stoves and oil cooking stoves. Retail—B. A. E. prices paid by farmers index for kitchen range, coal and wood burning; B. L. S. retail price series for gas range; and mail order catalog prices for a coal and wood range and an oil range.

24. *Refrigerators, washing machines and sewing machines.* Wholesale—B. L. S. whole sale price composite for electric refrigerators; as this series was not available for 1929-31, these years were estimated by the National Electrical Manufacturers' Association average factory price for electric refrigerators linked to the B. L. S. series. Also in-

cluded were the B. L. S. wholesale price indexes for the following: Electric ironer, automatic; electric sewing machines, composite; treadle sewing machines, composite; and electric washing machines. Retail—B. L. S. retail price data for the following: Electric refrigerators; ice refrigerators; washing machines, electric; and sewing machines, electric.\* B. A. E. prices paid by farmers series for the following: Sewing machines, treadle; washing machines, electric; washing machines, gasoline; and wringers.\* Also included was the B. L. S. wholesale price index for electric ironers, automatic.

25. *Miscellaneous electrical household appliances.* Wholesale—B. L. S. wholesale price indexes for the following: Electric vacuum cleaners; electric waffle irons; electric percolators; electric irons, automatic and nonautomatic; electric toasters; heater cord and plug sets; and electric fans, nonoscillating.\* Retail—B. L. S. retail price data for vacuum cleaners; B. L. S. wholesale price series for the following: Electric waffle irons; electric percolators; electric irons, automatic and nonautomatic; electric toaster; heater cord and plug set; and electric fans, nonoscillating.\*

26. *China, glassware, tableware, and household utensils.* Wholesale—B. L. S. whole sale price indexes for the following: Dinner sets, 2 series; nappies, glass; pitchers, glass; plates, white granite; teacups and saucers, white; tumblers, glass; carvers; knives and forks; plated silverware, 26-piece set; and galvanized pails. Also included was a mail order catalog price series for aluminum pans. Retail—Fairchild retail composite for china and glassware; B. L. S. retail price data for dinnerware, plate, teacups and saucers, and glassware; B. A. E. prices paid by farmers series for dinner plates\* and glass fruit jars; and mail order catalog price series for copper wash boilers, aluminum pans, and plated silverware sets, 4 series.

27. *Radio apparatus and phonographs.* Wholesale—Retail index deflated to wholesale level (see prefatory note). Retail—Fairchild retail composite for radios; B. L. S. retail price data for radios, regular console size; as the Fairchild series was not available for 1929 and 1930 and the B. L. S. series was not available for 1929-34 these years were estimated by the *Electrical Merchandising* retail average price series for all radios linked to the respective series. Also included were mail order catalog price series for radio tubes, 3 types.

28. *Pianos.* Wholesale—*Census of Manufactures* unit average factory price series for upright pianos and for baby grand pianos; as these were available for census years only, they were interpolated and extrapolated by the B. L. S. wholesale price series for upright pianos\* and baby grand pianos,\* respectively—Retail; Wholesale price index used directly, in absence of appropriate retailers' mark-up data.

29. *Other musical instruments.* Wholesale—Retail price index used directly, in absence of appropriate retailers' mark-up data. Retail—Mail-order catalog price series for the following: Clarinet outfit, complete; trumpet, brass; trumpet, medium priced; violin; drum heads; snare drum; saxophone; guitar; and mandolin.

30. *Clocks and watches.* Wholesale—Retail index deflated to wholesale level (see prefatory note). Retail—Mail-order catalog price series for the following: Alarm clock, inexpensive; jeweled watch, men's; nonjeweled pocket watch, men's, medium price; nonjeweled pocket watches, cheapest, 2 series; and nonjeweled wrist watches, 5 series. Also included was the B. L. S. wholesale price series for Westminster chime clocks.\*

31. *Jewelry and sterling silverware.* Wholesale—*Foreign Commerce and Navigation* import average price per carat of diamonds, cut but not set; mail-order catalog price series for plain gold wedding rings, 10 karats, 2 dwt.; and B. L. S. wholesale price series for sterling silverware, forks, knives, spoons and teaspoons, 9 series. Retail—Mail-order catalog price series for the following: Diamond engagement solitaires, gold settings, medium-quality diamonds,  $\frac{1}{4}$  and  $\frac{1}{2}$  carat, 4 series; diamond engagement solitaires, gold settings, finest quality diamonds,  $\frac{1}{4}$  and  $\frac{1}{2}$  carat, 4 series; diamond engagement solitaires, platinum settings, finest quality diamonds,  $\frac{1}{4}$  and  $\frac{1}{2}$  carat, 2 series; and plain gold wedding rings, 10 karats, 2 dwt. Also included were B. L. S. wholesale price series for sterling silverware pieces, 5 series.\*

32. *Books and other durable printed matter.* Wholesale—Retail index deflated to wholesale level (see prefatory note). Retail—Average retail prices for biographical and other nonfiction books, first-edition fiction books, textbooks and technical books estimated on basis of average book sellers' catalog prices. The latter were submitted by *The Publishers' Weekly*.

33. *Writing equipment.* Wholesale—B. L. S. wholesale price series for fountain pens; automatic pencils, 3 series. Also included were mail order catalog price series for portable typewriters, 8 series, deflated to wholesale level (see prefatory note). Retail—Mail order catalog prices for portable typewriters, 8 series, fountain pens, and automatic pencils.

34. *Ophthalmic products, and surgical and orthopedic appliances.* Wholesale—B. L. S. retail price data for ophthalmic lenses\* and eyeglass frames,\* deflated to wholesale level (see prefatory note). Retail—B. L. S. retail price data for glasses, complete,\* and ophthalmic lenses.\*

35. *Monuments and tombstones.* Wholesale—Bureau of Mines unit average price for monumental stone, marble and granite. Retail—Mail order catalog price series for monumental granite and monumental blue marble, 4 series.

36. *Luggage.* Wholesale—B. L. S. wholesale price indexes for suitcases, composite, and traveling bags, composite. Retail—Fairchild retail composite for luggage; index for 1929 and 1930 estimated by wholesale index linked to Fairchild data.

37. *Wheel goods, durable toys and sport equipment.* Wholesale—B. L. S. wholesale price indexes for the following: Baby carriages; boys' bicycles, 2 series; girls' bicycles, 2 series; children's velocipedes, 2 series; fishing reels; fishing rods, 8 series; golf clubs; roller skates; and tennis rackets.\* Also included were mail-order catalog price series for box cameras, 6 series. Retail—Mail-order catalog price series for the following: Standard double-bar bicycles; leather footballs; doll buggies; sleds; box cameras, 6 series; folding cameras, 4 series; and movie projectors, 4 series. Also included were B. L. S. wholesale price series for children's velocipedes;\* baby carriages;\* fishing reels and rods, 3 series;\* golf clubs;\* and tennis rackets.\*



38. *Passenger cars.* Wholesale—Bureau of Foreign and Domestic Commerce average realized delivered factory price series for passenger cars. Retail—Bureau of Foreign and Domestic Commerce average realized delivered factory price series for passenger cars, plus additional charges by retailers (average transportation costs and "pack" charges); this series was used from 1929 to 1939; for later years B. L. S. retail price data for Plymouth, Chevrolet, and Ford standard models\* were used to project the 1939 index.

39. *Replacement tires and tubes.* Wholesale—B. L. S. wholesale price composite indexes for passenger car balloon tires and passenger car inner tubes. Retail—Mail-order catalog price series for passenger car balloon tires and tubes. Also included was the B. A. E. prices paid by farmers for passenger car balloon tires.\*

40. *Passenger car replacement parts and accessories.* Wholesale—B. L. S. wholesale price indexes for spark plugs\* and for auto storage batteries.\* Also included were mail-order catalog price series for hot water auto heaters; duplicate spring sets for Fords and Chevrolets, 4 series; and replacement auto radiators, honeycomb and tubular types, 4 series. Retail—Mail order catalog price series for the following: Hot water auto heaters; tire chains; spark plugs, 2 series; auto storage batteries, 3 series; replacement spring sets for Fords and Chevrolets, 4 series; and replacement auto radiators, honeycomb and tubular types, 4 series.

41. *Pleasure craft.* Wholesale—Retail index deflated to wholesale level (see prefatory note). Retail—Mail-order catalog price series for flat-bottom rowboats and semiround-bottom dory boats, 4 series.

TABLE 3. CAPITAL EQUIPMENT AT WHOLESALE

42. *Industrial machinery.* B. L. S. wholesale price series for the following: Feed grinders, power, composite; hammer mills, grinding cylinders, 2 series; milking machines, composite; cream separators, composite; stationary electric motors; knitting machines, 8 series; extracting machines; standard ironers; and laundry washing machines.\* Also included was the Bureau of Valuation (Interstate Commerce Commission) cost index for shop machinery.

43. *Mining machinery.* Bureau of Valuation (Interstate Commerce Commission) cost indexes for the following: Ditchers; pneumatic tie tampers; miscellaneous roadway machinery; nonprecision "Class B" shop machinery; miscellaneous portable tools and apparatus; and handpush and velocipede cars. For 1942 these series were projected by Office of Price Administration machinery survey data.

44. *Construction machinery.* Bureau of Valuation (Interstate Commerce Commission) cost indexes for the following: Ditchers; miscellaneous roadway machines; pneumatic tie tampers; nonprecision "Class B" shop machinery; and miscellaneous portable tools and apparatus. For 1942 these series were projected by Office of Price Administration machinery survey data.

45. *General and miscellaneous machinery and equipment.* B. L. S. wholesale price indexes for industrial jacks; cold water meters; platform scales; and electric refrigerators.\* Also included were the Bureau of Valuation (Interstate Commerce Commission) cost indexes for nonprecision "Class B" shop machinery; miscellaneous roadway machines; and ditchers. For 1942, these series were projected by Office of Price Administration machinery survey data.

46. *Engines and turbines.* Bureau of Valuation (Interstate Commerce Commission) cost index for power plant machinery and B. L. S. wholesale price indexes for gasoline engines, composite, and diesel engines.\* For 1942, these series were projected by Office of Price Administration machinery survey data.

47. *Pumps and pumping equipment.* B. L. S. wholesale price indexes for power spraying outfits (2 series); pitcher pumps (3 series); force pumps (3 series); and water systems, shallow and deep well (4 series).\*

48. *Machine tools.* Bureau of Valuation (Interstate Commerce Commission) cost indexes for metal working "Class A" machinery for 1929-36; B. L. S. wholesale price index for machine tools, composite, for 1937-42. (Note: Both series moved almost identically from 1937-41; the B. L. S. index was not available prior to 1937).

49. *Electrical apparatus and equipment.* Bureau of Valuation (Interstate Commerce Commission) cost indexes for electrical machinery and apparatus, including turbines and generators, and for power substation apparatus. Also included was the B. L. S. wholesale price index for lighting plants, 1,800 watts.\* For 1942 these series were projected by Office of Price Administration machinery survey data.

50. *Farm machinery and equipment.* B. L. S. wholesale price indexes for the following: Agricultural implements composite group index, adjusted to exclude tractors. Also included were B. L. S. wholesale price series for hay forks, hoes, shovels, spades, and agricultural pumps, composite.

51. *Tractors.* B. L. S. wholesale price indexes for tractors, 2-plow, 3-4-plow, and crawler types, composite.

52. *Office machinery.* B. L. S. wholesale price indexes for standard model typewriters,\* numbering machines,\* calculating and adding machines, 3 series.\* Also included were mail-order catalog price series for adding-listing machines, composite adding machines, composite, and duplicating machines, composite.

53. *Nonresidential furniture and equipment.* B. L. S. wholesale price indexes for office side chairs, composite; office swivel chairs, composite; office desks, flat top, composite; and office desks, typewriter, composite. Also included were the wholesale price indexes for Group 20, Household furniture, and for Group 21, Floor coverings.

54. *Durable containers.* B. L. S. wholesale price indexes for steel tanks, 3 series; and steel barrels, 3 series.\*

55. *Professional and scientific equipment.* Mail-order catalog price series for the following: Surveying instruments; combination level-transits, 4 series; drawing instruments; "T" squares and triangular scales, 3 series; binoculars, 3-power, 3 series; reading glasses, 2 series; compass; jeweled precision watch, expensive; motion picture cameras, 5 series; and motion picture projectors, 3 series. Also included was the B. L. S. wholesale price index for meters, cold water.\*

56. *Tools.* B. L. S. wholesale price indexes for the following: Knives, corn; axe; hatchets; chisels; forks, hay; shovels; spades; hammer, carpenter's; planes; saws, crosscut; hand saws; vises, box; drills, breast; files; portable drills, air; and portable rock drills, air.\*

57. *All other subsidiary durable equipment.* B. L. S. wholesale price indexes for the following: Duck, sail; leather belting; suitcases; traveling bags; wire fence, plain, barbed, galvanized and woven, 4 series; rubber hose; padlocks; spring scales; fire extinguishers; and rubber belting, transmission.\*

58. *Business motor vehicles.* B. L. S. wholesale price composite index for trucks, combined with the wholesale price index for Group 35, Passenger cars.

59. *Motorcycles.* F. o. b. factory price series for Harley-Davidson motorcycles, 4 models, and for Indian motorcycles, 4 models, obtained from *Motorcycle Reference Book*, published by Middle Atlantic Dealers Association.

60. *Locomotives and railroad cars.* Bureau of Valuation (Interstate Commerce Commission) cost indexes for steam locomotives; other locomotives; freight train cars; and passenger train cars.

61. *Ships and boats.* Bureau of Valuation (Interstate Commerce Commission) cost indexes for floating equipment, and for passenger car trains.